

REMARKS

Claims 1, 4, 6-10, 14-17 and 20 are pending in the application, and are rejected. Claims 1, 4, 14, 16, 17 and 20 are herein amended. Claims 21-25 are herein added. No new matter has been entered.

Claim Rejections - 35 U.S.C. §112

The Examiner notes that claims 1, 14, 16 and 17 each recite that the copolymer has glass transition point less than or equal to 50°C, and newly added claim 20 recites that the copolymer has glass transition point of -30 to 50°C. The Examiner asserts that these limitations are unsupported by the specification because there does not appear to be a written description requirement for the upper limit of the glass transition temperature of 50 °C in the originally filed application.

Applicants herein amend claims 1, 4, 14, 16, 17 and 20 to recite more exact upper limit for the temperature range, which finds exact support in the specification. Applicants note that Example 6 having a Tg of 65°C is shown in Table 1. Applicants submit that this amendment overcomes the rejection.

The Examiner rejects claims 1, 14, 17 and 20 because each recites “1 wt% or more of polymeric monomer including a polar group”. The Examiner asserts that such a broad value is unsupported in the specification, because examples of the polymeric monomer include values only of 5%, 7%, and 10%.

Applicants herein amend claims 1, 14, 17 and 20 to amend “1 or more wt%” to “5 through 10 wt %”. Applicants submit that this range is fully supported in the specification. Therefore, Applicants submit that this amendment overcomes the rejection.

Claims 1, 4, 6-10 and 14-17 are rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter. Claims 1, 14, 16 and 17 each recite that the monomers include “styrene derivatives”, “alkyl acrylate derivatives” and “alkyl methacrylate derivatives”. The Examiner asserts that she can not determine what compounds are encompassed by this phrase.

Applicants herein amend claims 1, 14, 16 and 17 to remove the term “derivative”, thus mooted the rejection. With respect to the new terms “substituted or unsubstituted acrylate and “substituted or unsubstituted alkyl metacrylate” Applicants note that examples of such derivatives are found in the specification in Table 1. Substituents may be hydroxyl, amino and ammonium groups.

Claim Rejections - 35 U.S.C. §103

Claims 1, 4, 6-10, 14-17 and 20 remain rejected under 35 U.S.C. §103(a) as being unpatentable over Nguyen et al. (U.S. Patent No. 6,248,805) in view of Patel et al. (U.S. Patent No. 5,977,210) and Fujisawa et al. (U.S. Patent No. 5,997,136). The Examiner asserts that although there is no explicit disclosure in Nguyen et al. that the surfactant covers a surface of the copolymer, given that the surfactant and copolymer are mixed together in Nguyen et al.

(examples), it would have been natural for one of ordinary skill in the art to infer that the surfactant intrinsically covers a surface of the copolymer.

The Examiner notes that Nguyen et al. disclose an ink jet ink comprising (i) 0.1-10% polymer which has the structure ABC where A is a hydrophobic monomer such as alkyl (meth)acrylate, B is a hydrophobic monomer such as styrene, and C is a monomer that has a polar functional group including (meth)acrylic acid, (ii) solvent which is liquid at room temperature, and (iii) colorant which is a dye or pigment wherein the colorant is dispersed in the polymer. The polymer has glass transition temperature of -25 to 110°C and is produced using emulsion polymerization. The polymer is obtained from 5-95% monomer A, 5-95% monomer B, and 0-30% monomer C.

Applicants herein amend independent claims 1, 14, 16, 17 and 20 to reflect that the colorant is not dissolved in the solvent; rather, colorant is dissolved or dispersed in the copolymer particles, or dispersed in the solvent with the copolymer particles by absorption on or coating a surface of the copolymer particles. Such limitation/feature is described in current claims 6 to 8.

Nguyen does not teach or suggest feature of the present invention. The Examiner notes that “in one embodiment, the polymer encapsulates the colorant”, and “there is no limit to the type of association between the colorant and the polymer”. However, the present feature provides an unexpectedly superior result over the prior art. That is,

Because of the above limitation, when the ink is applied to the recording medium, the solvent penetrates into the recording medium but the colorant and copolymer particles do not

penetrate into the recording medium. Therefore, no blur is produced. The colorant and copolymer particles remaining on the surface of the recording medium thereafter combine to form a filmy shape and are stably fixed on the recording medium. This film shaping begins automatically when the solvent penetrates into the recording medium.

Moreover, comparing polymeric monomers of the present invention and Nguyen, in the polymeric monomers shown in Table 1, BQA, VP, and DMPC are not described in Nguyen, i.e., they are not taught or suggested by Nguyen. Claims directed to this subgroup are included herein as new claims 21-25.

In the addition, the Examiner point out that: "it is not described in the Nguyen that the volume average particle diameter is 0.05 to 1 μ m, but given that Nguyen et al. produces the polymer by emulsion polymerization as presently claimed, it would have been natural..., and thus one of ordinary skill in the art would have arrived at the claimed invention".

However, Applicants note that when polymer is simply produced by emulsion polymerization with similar composition and ratio of monomer as in Nguyen, not all of copolymer particles have volume average particle diameter of 0.05 to 1 μ m, but some copolymer particles having volume average particle diameter of less than 0.05 μ m or more than 1 μ m are produced (see p. 7, 1.17-18, p.9, 1.11-12 of the English specification at the time of filing).

Therefore, since the limitation in the claims (copolymer has a volume average particle diameter ranging from 0.05 through 1 μ m) is a feature of the present invention which are clearly distinct from Nguyen, it would not necessarily have been natural for one of ordinary skill in the art to infer, and thereby arrive at the claimed invention.

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In view of the aforementioned amendments and accompanying remarks, Applicants submit that the claims, as herein amended, are in condition for allowance. Applicants request such action at an early date.

If the Examiner believes that this application is not now in condition for allowance, the Examiner is requested to contact Applicants' undersigned attorney to arrange for an interview to expedite the disposition of this case.

If this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. The fees for such an extension or any other fees that may be due with respect to this paper may be charged to Deposit Account No. 50-2866.

Respectfully submitted,

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